CONTINUOUS WATER QUALITY DATA MODELING FOR LOWER HACKENSACK RIVER

Jain, Aridaman[1]**;Johnson**, Ken[1]; **Hobble**, Christine[2]

The New Jersey Meadowlands Commission's Meadowlands Environmental Research Institute (MERI) monitors water quality by continuously collecting the water quality data in the Hackensack River and its tributaries. In 2004, the New Jersey Meadowlands Commission established three continuous water monitoring stations and one weather station within the Hackensack River Estuary. There are 8 variables of interest within a site (collected at the continuous water quality monitoring stations) and 8 variables external to a site (collected at the continuous weather monitoring station). The variables within a site are: Depth of Water, Conductivity, Dissolved Oxygen, Dissolved Oxygen Percent Saturated, Salinity, Turbidity, pH, and Water Temperature. The variables external to the site are Air Temperature, Barometric Pressure, Rainfall, Relative Humidity, Solar Radiation Watts, Wind Direction Degrees, Wind Speed, and Battery Park Water Depth.

This paper describes Phase I of the analysis of the water quality data and the development of time series models for forecasting each of the 7 site variables at Kearny and Mill Creek stations based on 2 and 7 months of data for Kearney and Mill Creek, respectively. The process of forecasting the water quality by using these models and identifying unusual measurements that are outside the control limits was mechanized by developing an Excel-macros program. When an observed value turns out to be outside the 95% tolerance interval, it would be investigated to determine if it occurred due to an instrument problem along with the causes of such a malfunction of the measuring instrument.

Since Phase I data did not capture the normal seasonal variation for spring, summer and fall, now additional data are being collected to cover a full one-year period. This one-year data will be used in Phase II to develop comprehensive models that incorporate the seasonal variations and the new models will be used to recalibrate the Excel-macros program.

[1] New Jersey Institute of Technology, Newark, NJ
[2] Meadowlands Environmental Research Institute, New Jersey Meadowlands Commission, Lyndhurst, NJ